

CLAIMS

We claim:

1 1. A process for making a biocompatible biodegradable fleece, the process
2 comprising:

3 a. providing a solution comprising a crosslinkable synthetic macromer, the synthetic
4 macromer comprising a polymeric hydrophilic region surrounded by two or more regions each
5 comprising one or more moieties forming a biodegradable region and a crosslinkable moiety;

6 b. freezing the solution in a desired shape;

7 c. vacuum-drying the solution; and

8 d. crosslinking the crosslinkable macromer
9 to produce the fleece.

1 2. The process of claim 1 wherein the vacuum-drying step is performed
2 before the crosslinking step.

1 3. The process of claim 1 wherein the vacuum-drying step is performed after
2 the crosslinking step.

1 4. The process of claim 1 wherein the macromer solution further comprises
2 at least one of a polymerization-causing material and a biologically active agent.

1 5. The process of claim 4 wherein the biologically active agent is selected
2 from the group consisting of antibiotics, growth regulating molecules, hemostatic agents,

3 antibodies, antigens, transfection vectors, expression vectors, anesthetics, and anti-arrhythmic
4 agents.

1 6. The process of claim 1, wherein the crosslinking is performed by the use
2 of at least one of ionizing radiation, non-ionizing radiation, heat, addition of initiators, and
3 addition of crosslinking chemicals or ions.

1 7. The process of claim 1, wherein the crosslinking is performed by a free
2 radical polymerization reaction.

1 8. The process of claim 1 further comprising a rinsing of the crosslinked
2 macromer.

1 9. The process of claim 8 further comprising the step of shredding the
2 crosslinked macromer after rinsing.

1 10. The process of claim 1 further comprising the step of shredding the
2 crosslinked macromer to form fleece particulates.

1 11. The process of claim 1 further comprising the step of shredding the
2 crosslinked macromer after at least one of the freezing step and the vacuum-drying step.

1 12. The process of claim 1 wherein a supporting material is incorporated into
2 the fleece.

1 13. The process of claim 12 where the incorporation of the supporting
2 material occurs during the freezing step.

1 14. A biocompatible biodegradable fleece particulate produced by the process
2 of claim 10.

1 15. The process of claim 10, further comprising the wetting of the fleece
2 particulates with an aqueous solution.

1 16. The process of claim 15 further comprising the adding of at least one of a
2 cell, a polymerization-causing material, and a biologically active agent to the wetted fleece
3 particulates.

1 17. A biocompatible biodegradable fleece produced by the process of claim 1.

1 18. A biocompatible biodegradable fleece particulate produced by the process
2 of claim 10.

1 19. A biocompatible biodegradable fleece particulate produced by the process
2 of claim 16.

1 20. A biocompatible biodegradable fleece, wherein the fleece comprises
2 crosslinked synthetic macromers, at least one of the synthetic macromers comprising a polymeric
3 hydrophilic region surrounded by two or more regions each comprising one or more moieties
4 forming a biodegradable region and a crosslinked moiety, and wherein the fleece is
5 macroporous.

1 21. The fleece of claim 20, further comprised of at least one of a cell, a
2 polymerization-causing material and a biologically active agent.

1 22. The fleece of claim 20 which is in the form of fleece particulates.

1 23. The fleece of claim 21 which is in the form of fleece particulates.

1 24. The fleece of claim 20, comprising a diacrylated polyethylene oxide
2 comprising biodegradable linkages selected from the group consisting of monomers and
3 oligomers of carbonates and hydroxyacids.

1 25. The fleece of claim 24, further comprised of at least one of a cell, a
2 polymerization-causing material, and a biologically active agent.

1 26. The fleece of claim 24 which is in the form of fleece particulates.

1 27. The fleece of claim 25 which is in the form of fleece particulates.

1 28. The fleece of claim 20, wherein the fleece has at least two regions of
2 differing composition.

1 29. The fleece of claim 1, wherein the crosslinkable macromer is water
2 soluble.

1 30. The fleece of claim 1, wherein bubbles are incorporated into the solution
2 before the freezing step.

1 31. A slurry comprising the biocompatible fleece particulates of claim 19 and
2 an aqueous solution.

1 32. The slurry of claim 31, wherein the aqueous solution comprises at least
2 one of a cell, a polymerization-causing material, and a biologically active agent.

1 33. A slurry comprising the biocompatible fleece particulates of claim 23 and
2 an aqueous solution.

1 34. The slurry of claim 33, wherein the aqueous solution comprises at least
2 one of a cell, a polymerization-causing material and a biologically active agent.

1 35. A slurry comprising the biocompatible fleece particulates of claim 27 and
2 an aqueous solution.

1 36. The slurry of claim 35, wherein the aqueous solution comprises at least
2 one of a cell, a polymerization-causing material, and a biologically active agent.

1 37. The method of treating a wound or defect by applying to the wound or
2 defect the slurry of claim 31.

1 38. The method of treating a wound or defect by applying to the wound or
2 defect the slurry of claim 33.

1 39. The method of treating a wound or defect by applying to the wound or
2 defect the slurry of claim 35.

1 40. The method of claim 38 wherein the slurry comprises living cells.

1 41. The method of claim 40 wherein the defect is a chondral defect, and the
2 living cells are chondrocytes.

1 42. The method of claim 41 further comprising applying a primer solution to
2 the outer edges of the chondral defect, and applying a sealant to the primed area of the defect to
3 seal the slurry to the defect.

1 43. The method of claim 42, wherein the sealant is applied as a biodegradable,
2 polymerizable macromer, and the macromer is subsequently polymerized.

1 44. The method of claim 41 further comprising the step of applying a primer
2 solution to the outer edges of the chondral defect, applying a sealant to the primed area of the
3 defect to cover the chondral defect with the sealant, and then applying the slurry between the
4 sealant and the defect.

1 45. The method of claim 44, wherein the sealant is applied as a biodegradable,
2 polymerizable macromer, and the macromer is subsequently polymerized.

1 46. The method of claim 43, wherein the polymerization is performed by use
2 of at least one of ionizing radiation, non-ionizing radiation, heat, addition of initiators, and
3 addition of crosslinking chemicals or ions.

1 47. The method of claim 38 where the treatment comprises at least one of
2 hemostasis, protection from the atmosphere, protection from drying, and delivering a cell or
3 biologically active agent to the wound.

1 48. The use of the biocompatible biodegradable fleece of claim 20 for drug
2 delivery.

1 49. The use of the biocompatible biodegradable fleece of claim 20 to prevent
2 tissue adhesions.

1 50. The use of the biocompatible biodegradable fleece of claim 20 to culture
2 cells and the subsequent implantation of the fleece with the cells to a defect.

1 51. The use of the biocompatible biodegradable fleece of claim 20 to provide
2 a substrate for tissue engineering.

1 52. The method of treating a wound or defect by applying to the wound or
2 defect a slurry comprising an aqueous solution and biocompatible fleece particulates of claim 27,
3 which comprises cells selected from the group consisting of chondrocytes, cardiomyocytes, and
4 stem cells.

1 53. The method of claim 52, wherein the stem cells are mesenchymal stem
2 cells.

1 54. A slurry comprising an aqueous solution and biocompatible fleece
2 particulates of claim 27, which comprises cells selected from the group consisting of
3 chondrocytes, cardiomyocytes, and stem cells.

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